

WHAT IS CLAIMED IS:

1. A subminiature bone conduction speaker using a vibrating plate comprising:
 - a body having a shape of a cylinder with an upper portion and a
5 lower portion opened;
 - a mastoid having a lower diameter and an upper diameter, wherein the lower diameter is relatively smaller than the upper diameter;
 - a vibrating plate being inserted to a lower portion of the mastoid to close an upper opening portion of the body, wherein the vibrating plate is
10 made of an elastic material;
 - an auxiliary vibrating plate being inserted to a lower portion of the mastoid under the vibrating plate which is inserted to the mastoid;
 - a vibrating coil being attached on a lower side of the auxiliary vibrating plate;
 - 15 a speaker plate being fixed at an inner central portion of the body having the shape of the cylinder, wherein a central hole is provided at the central portion of the speaker plate;
 - a ring type magnet being fixed on the speaker plate;
 - a yoke, wherein an edge portion of the yoke is fixed on the ring type
20 magnet and a central portion of the yoke has a protrusion which protrudes in the inside direction of the central hole of the speaker plate;
 - an acoustic vibrating plate being fixed at a lower portion of the body to close a lower plane of the body;
 - an acoustic coil being fixed on the acoustic vibrating plate and being
25 inserted between the ring type magnet and the yoke; and

an electrical signal input unit for applying a predetermined electrical signal to at least one of the vibrating coil and acoustic coil.

2. A subminiature bone conduction speaker using a vibrating plate
5 according to claim 1, wherein the vibrating plate is inserted into a first groove which is formed at an upper portion of the body, and then fixed to the body with the front cap.
3. A subminiature bone conduction speaker using a vibrating plate
10 according to claim 1, wherein a howling preventing holes is formed in at least one of the mastoid, the auxiliary vibration plate, and the protrusion of the yoke.
4. A subminiature bone conduction speaker using a vibrating plate
15 according to claim 1, wherein the speaker plate is fixed by being inserted into a second groove which is formed at a central portion within the body.
5. A subminiature bone conduction speaker using a vibrating plate
according to claim 1, wherein a speaker protective cap is further provided to
20 a lower side of the acoustic vibrating plate.
6. A subminiature bone conduction speaker using a vibrating plate
according to claim 5, wherein an acoustic hole is further provided to the speaker protective cap.

7. A subminiature bone conduction speaker using a vibrating plate according to claim 1, wherein the acoustic vibrating plate is made of beryllium copper.

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8. A subminiature bone conduction speaker using a vibrating plate according to claim 1, wherein the ring type magnet is made of neodymium material.

10 9. A subminiature bone conduction speaker using a vibrating plate according to claim 1, wherein the electrical signal input unit comprises: a first outgoing line being connected to the vibrating plate and extended to the exterior of the body;

a second outgoing line being connected to the acoustic vibrating
15 plate and extended to the exterior of the body; and

a connection terminal being provided to the exterior of the body, wherein the connection terminal is connected to the first and second outgoing lines, and wherein the electrical signal is input to at least one of the first and second outgoing lines through the connection terminal.

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10. A mobile phone comprising a subminiature bone conduction speaker, wherein the subminiature bone conduction speaker comprising:

a body having a shape of a cylinder with an upper portion and a lower portion opened;

25 a mastoid having a lower diameter and an upper diameter, wherein

the lower diameter is relatively smaller than the upper diameter;

a vibrating plate being inserted to a lower portion of the mastoid to close an upper opening portion of the body, wherein the vibrating plate is made of an elastic material;

5 an auxiliary vibrating plate being inserted to a lower portion of the mastoid under the vibrating plate which is inserted to the mastoid;

a vibrating coil being attached on a lower side of the auxiliary vibrating plate;

a speaker plate being fixed at an inner central portion of the body
10 having the shape of the cylinder, wherein a central hole is provided at the central portion of the speaker plate;

a ring type magnet being fixed on the speaker plate;

a yoke, wherein an edge portion of the yoke is fixed on the ring type magnet and a central portion of the yoke has a protrusion which protrudes in
15 the inside direction of the central hole of the speaker plate;

an acoustic vibrating plate being fixed at a lower portion of the body to close a lower plane of the body;

an acoustic coil being fixed on the acoustic vibrating plate and being inserted between the ring type magnet and the yoke; and

20 an electrical signal input unit for applying a predetermined electrical signal to at least one of the vibrating coil and acoustic coil.